

Climate Program Office Arctic Focus

Recent, rapid changes in Arctic climate, Arctic Oceans, and sea ice have potential impacts on transportation, energy development, pollution, national security, food security and weather predictions, as well as safe navigation, oil spill response readiness, and climate change adaptation strategies. Moreover, evidence shows that climate changes in the Arctic may play a major role in global-scale climate and mid-latitude weather. These issues are critical for NOAA and the U.S. economy. Therefore, it is important for NOAA to contribute observing capabilities towards an international effort to monitor the rapidly changing Arctic, advance understanding of the Arctic environment, develop a capability to skillfully and reliably predict regional variations and changes in the Arctic (including especially Arctic sea ice) on time scales of a few months to decades, and encourage supportive research on utilizing climate information in decisional contexts. NOAA's Climate Program Office has lead NOAA in supporting climate observing and research in this rapidly changing part of the globe. Given the increased importance of this region and urgent needs for better information and capabilities, CPO envisions an increased focus on Arctic research. In this FY15 FFO CPO calls for activities in observations, analysis, and modeling causes and consequences of sea ice loss in the Arctic. In future years other areas of Arctic research may be emphasized.

Climate Variability and Predictability (CVP) FY 2015

Competition Name: Understanding Arctic Sea Ice Mechanisms and Predictability

The climate in the Arctic is rapidly changing, especially with regard to rapid temperature changes, and loss of sea and land-fast ice. Observed records of the area covered by sea ice in the Arctic at the end of summer has shrunk by about 40% since 1979, with 2007 and 2012 being years of record low sea ice. These changes are vitally important to NOAA and the Nation as our citizens living in the Arctic are impacted due to increased strong storms and increased coastal erosion. These changes also affect our future access to transportation routes, economic development in the Arctic, and access to natural resources.

In order for our Nation to understand, prepare, and respond to the changing Arctic, we need improved predictions of weather, climate, and the fully coupled system of atmosphere-ocean-land-ice-ecosystem. Some of the current challenges for improved predictions are a lack of adequate and integrated observations in the Arctic region, climate and weather models that were historically developed to have high skill in the mid- and lower-latitudes, and a nascent understanding of the unique weather and climate processes that drive the coupled Arctic system. Therefore, it is important for NOAA to develop a capability to skillfully and reliably predict regional variations and changes in Arctic sea ice on time scales

of a few months to decades to improve our predictive capability and address the need for environmental information for informed decision making.

In FY 2015, the CVP program invites data and model (single model, multi-model, and/or hi-resolution) experimentation and analysis that seeks to advance the understanding of Pan-Arctic sea ice interactions in any of the following areas:

- Climatic mechanisms that affect Arctic temperatures and growth and/or loss of sea ice.
- Mechanisms, predictability and prediction of regional sea ice variation and change.
- Systematic predictability of the fully coupled climate-ocean-ice system, its driving factors, its state dependence as external forcings change, and whether such predictability can be achieved in operational-like predictions.

The goal of this research is to improve future operational predictions. Partnership with NOAA labs and centers is strongly encouraged. Use of NOAA-funded observational data is encouraged but not required. Examples of NOAA-funded observational data are:

- NOAA Climate Observations Division Arctic Data: www.arctic.noaa.gov/data.html
- CRREL Sea Ice data: <http://imb.crrel.usace.army.mil/>
- Polar Science Center - UW: <http://psc.apl.washington.edu/wordpress/research/sea-ice/>

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Please carbon copy (cc:) Kendra Hammond (kendra.hammond@noaa.gov) on any LOI or grant related correspondence.

Arctic Research Program for FY 2015-2020

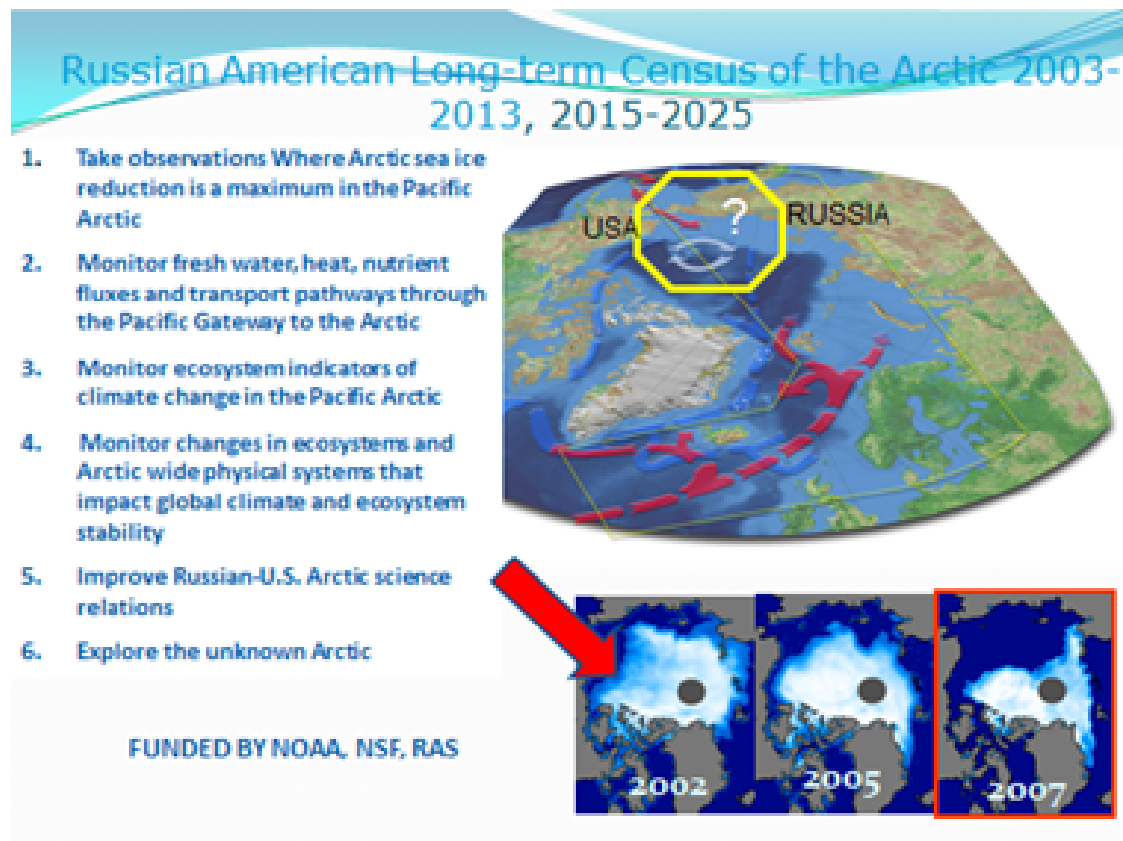
Competition Name: Pacific Arctic Observations and Modeling of the Causes and Consequences of Sea Ice Loss

The Arctic Research Program supports the following in situ observing networks

- International Arctic Buoy Program (IABP)
- Arctic Sea Ice Thickness Network
- Arctic Ocean – Ecosystem, benthic fluxes Interactions Network (The RUSALCA program and the Pacific Arctic Group (PAG) coordination)
- International Arctic System for Observing the Atmosphere (IASOA)
- The Distributed Biological Observatory, (DBO)
- The Circumpolar Marine Biodiversity Monitoring Program (CBMP-Marine)

This is a call for proposals to carry out multidisciplinary and multi-Arctic-Network coordination for 5 years (from 2015-2020) of observations, analysis and modeling in the Pacific Arctic; (within the Chukchi-Beaufort Sea, the East Siberian Sea, and the Arctic Ocean north of these regions). This is an opportunity to combine the goals of RUSALCA (Figure 1), PAG, IASOA, and sea ice observations to decipher how the changing atmosphere, ice, ocean, ecosystem and benthic flux system is altering in response to increasing heat flux from the northward flowing Pacific Water, the eastward flowing Atlantic Water, enhanced mixing of surface waters, and increased solar radiation. (figure 2)

Figure 1, Goals and geographic scope of the RUSALCA program



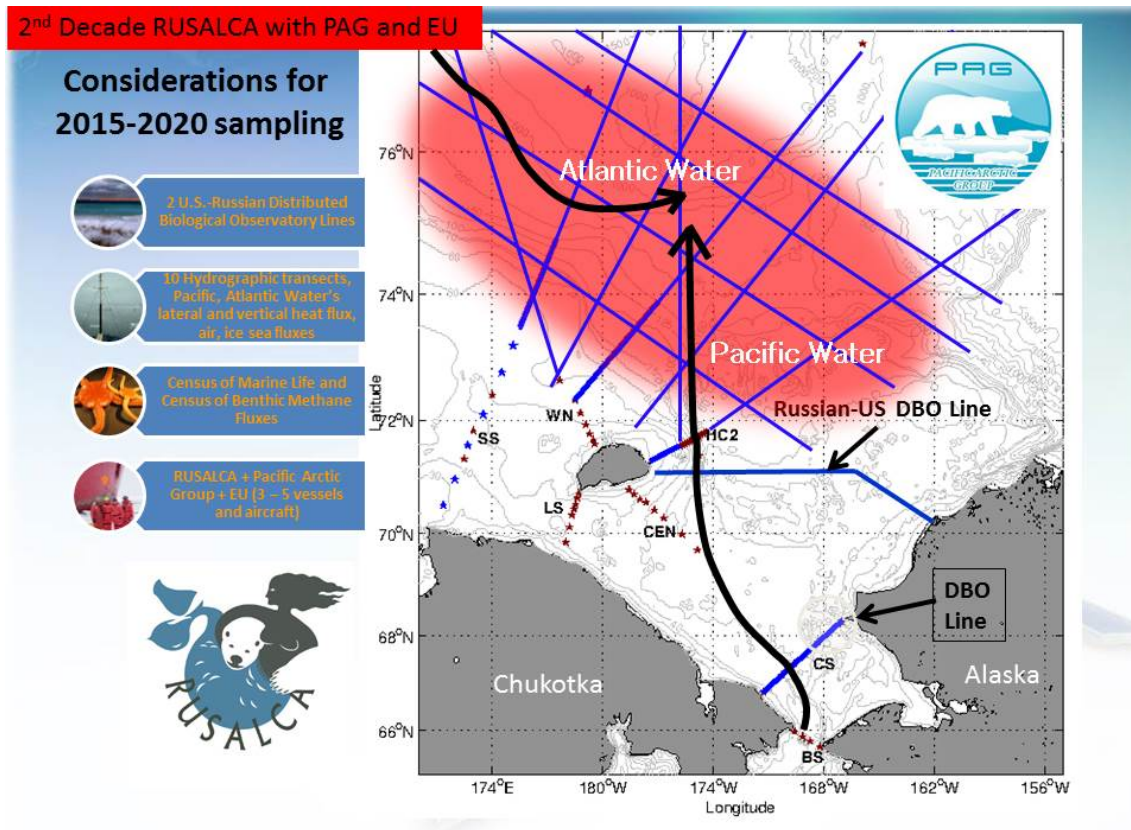


Figure 2. Focal region (red region, where Atlantic Water and Pacific Water may merge)

The ARP invites proposals to:

- **Continue the long-term observations of the Distributed Biological Observatory Transect (Line 3) from the U.S to Russia and establish a new DBO transect from the North of Alaska's west coast Line 4 to Russia's Wrangel Island. (Figure 3)** Applicants must propose to re-occupy station locations and CTD transects established in 2004 - 2012 and must propose instrumentation that provides data that can be compared directly and harmoniously with physical, nutrient, and ecosystem data collected during the first decade of RUSALCA. It is acceptable to propose alternate or advanced observational technologies, as long as the new approach meets the comparability requirement. Details of the 2004-2012 mooring, sampling and CTD activity can be found at www.arctic.noaa.gov. Proposers should assume that starting in 2015, there will be a biannual (possibly annual) cruise in the summer to the study area departing from Nome, or possibly Anadyr, Russia.

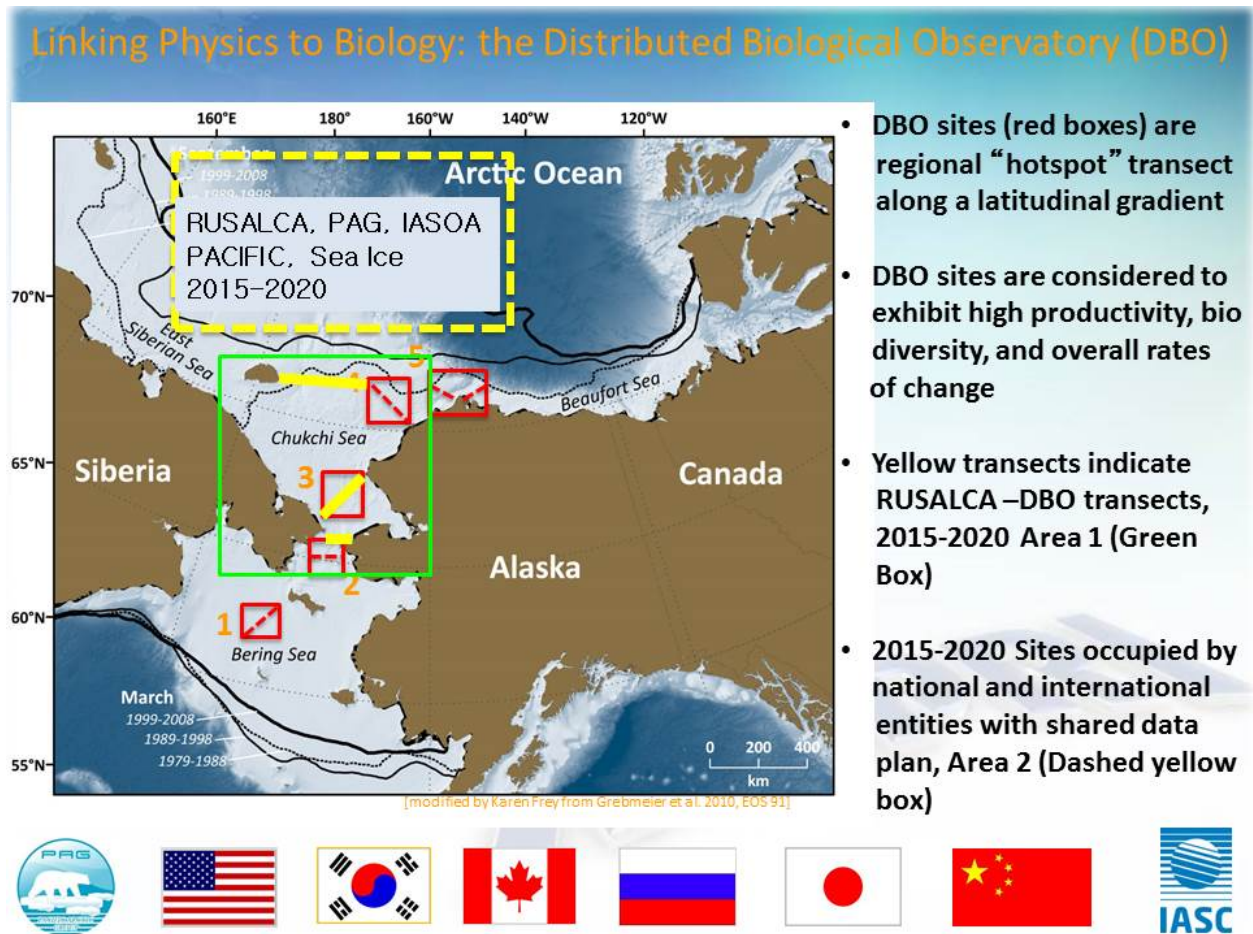


Figure 3, Transects in yellow indicate the Bering Strait mooring array, DBO transects 3 and 4 plus (Green Box) the northern 2015-2020 RUSALCA region (Dashed Yellow Box)

- **Make multidisciplinary observations in the region of the Shelf-Slope-Basin of the Pacific Arctic that lies to the north of the Chukchi and East Siberian Seas (Figure 3).** New sets of sentinel stations and transects will be created and will be reoccupied at least twice in the 2015-2020 time period. Sampling and analyses that provide data in a manner that is harmonious with data protocols accepted during the first decade of RUSALCA (www.arctic.noaa.gov) are expected. Applicants may propose additional sampling and analysis approaches that will build on the results from RUSALCA’s first decade. In addition, it is anticipated that this work will be carried out in coordination with the vessels of partner countries from the Pacific Arctic Group and other nations if possible. Coordination between objectives, sampling sites and data exchange will become a priority once partners are identified. Proposers should assume that work under this section will be conducted in late summer 2016-2020, the dates of which may vary depending on ship schedules and financial commitments from partner nations. NOAA may adjust this schedule if resources permit, and if so, will ask to renegotiate awards. Possibilities for collaboration with the North Pacific

Research Board's Arctic Research Program are encouraged. For further information please contact danielle.dickson@nprb.org.

- Develop Model-based data assimilation capabilities to improve models that:
 - address impacts of Pacific Arctic sea ice loss on the Pacific Arctic Ocean and its ecosystems and
 - link long-term sea-ice reductions with impacts on mid-latitudes . *Additional sea ice process understanding studies will be available in the Climate Variability and Predictability Program.

Partnership with NOAA labs and centers and collaborations with scientists from the Russian Federation, and other members of the Pacific Arctic Group are strongly encouraged.

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Additional background material may be found on the web site: www.arctic.noaa.gov